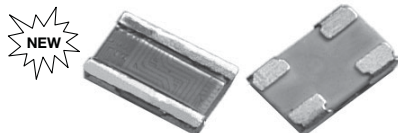




**THE DATASHEET OF  
Y16063R30000F9R**



## Ultra High Precision Z-Foil Surface Mount Current Sensing Chip Resistor with Power Rating to 1 W and Temperature Coefficient of Resistance of $\pm 0.05$ ppm/°C and Power Coefficient of 5 ppm at Rated Power



### INTRODUCTION

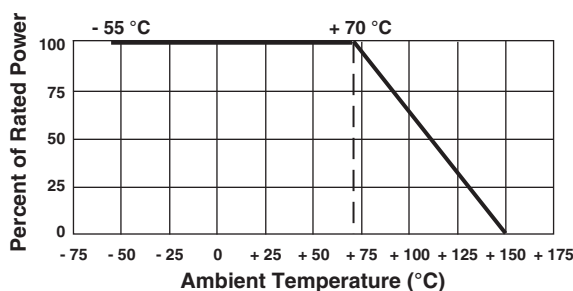
The Z-foil technology provides a significant increase of stability of resistance value's sensitivity to ambient temperature variations (TCR) and applied power changes (PCR). Designers can now guarantee a high degree of stability and accuracy in fixed-resistor applications using solutions based on VPG's revolutionary Z-foil technology.

Model VCS1625ZP is a surface mount chip resistor designed with 4 pads for Kelvin connection. Utilizing VPG's Bulk Metal® Z-foil as the resistance element, it provides performance capabilities far greater than other resistor technologies can supply in a product of comparable size. 0.05 ppm/°C typical TCR removes errors due to temperature gradients.

This small device dissipates heat almost entirely through the pads so surface mount users are encouraged to be generous with the board's pads and traces.

The four terminal device separates the current leads from the voltage sensing leads. This configuration eliminates the effect of the lead wire resistance from points A to B and C to D, allowing low TCR current sensing.

**FIGURE 1 - POWER DERATING CURVE**



### FEATURES

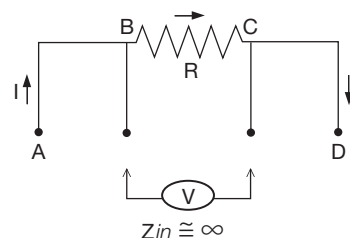
- Temperature coefficient of resistance (TCR):
  - ± 0.05 ppm/°C typical (0 °C to + 60 °C)
  - ± 0.2 ppm/°C typical (- 55 °C to + 125 °C, + 25 °C ref.) (see table 1)
- Resistance range: 0.3 Ω to 10 Ω (for higher or lower values please contact us)
- Vishay Foil Resistors are not restricted to standard values, we can supply specific "as required" values at no extra cost or delivery (e.g. 1.234 Ω vs. 1 Ω)
- Resistance Tolerance: to ± 0.2% (0.05% and 0.1% are also available)
- Power coefficient "ΔR due to self heating": 5 ppm at rated power
- Load life stability: 0.015 % at 70 °C, 2000 h at rated power
- Electrostatic discharge (ESD) at least to 25 000 V
- Short time overload < 0.005 %
- Thermal stabilization time < 1 s (nominal value achieved within 10 ppm of steady state value)
- Power rating: 1 W at + 70 °C (figure 1)
- Non inductive, non capacitive design
- Rise time: 1 ns effectively no ringing
- Current rating: 1.8 A maximum
- Current noise: 0.010 μV<sub>RMS</sub>/V of applied voltage (< - 40 dB)
- Voltage coefficient: < 0.1 ppm/V
- Non inductive: < 0.08 μH
- Non hot spot design
- Prototype quantities available in just 5 working days or sooner.
- For higher temperature application above +150 °C and for better performances please contact us.



RoHS\*  
COMPLIANT

### TERMINATIONS

- Two lead (Pb)-free options are available:
  - gold plated or tin plated
- Tin/lead plated



**TABLE 1 - SPECIFICATIONS (1)**

MODEL NUMBER	RESISTANCE RANGE	RESISTANCE TOLERANCE(4)	TYPICAL TCR and MAX. SPREAD (- 55 °C to + 125 °C, + 25 °C Ref)	POWER RATING at + 70 °C (2)	MAXIMUM CURRENT (2)
VCS1625ZP	> 2.0 Ω to 10 Ω 0.3 Ω to 2.0 Ω	± 0.2 %, ± 0.5 %; ± 1.0 % ± 0.5 %; ± 1.0 %	± 0.2 ± 2.8 ppm/°C	1 W on FR4 PCB(3)	1.8 A

#### Notes

(1) Tighter performances are available. Please contact application engineering [foil@vishaypg.com](mailto:foil@vishaypg.com)

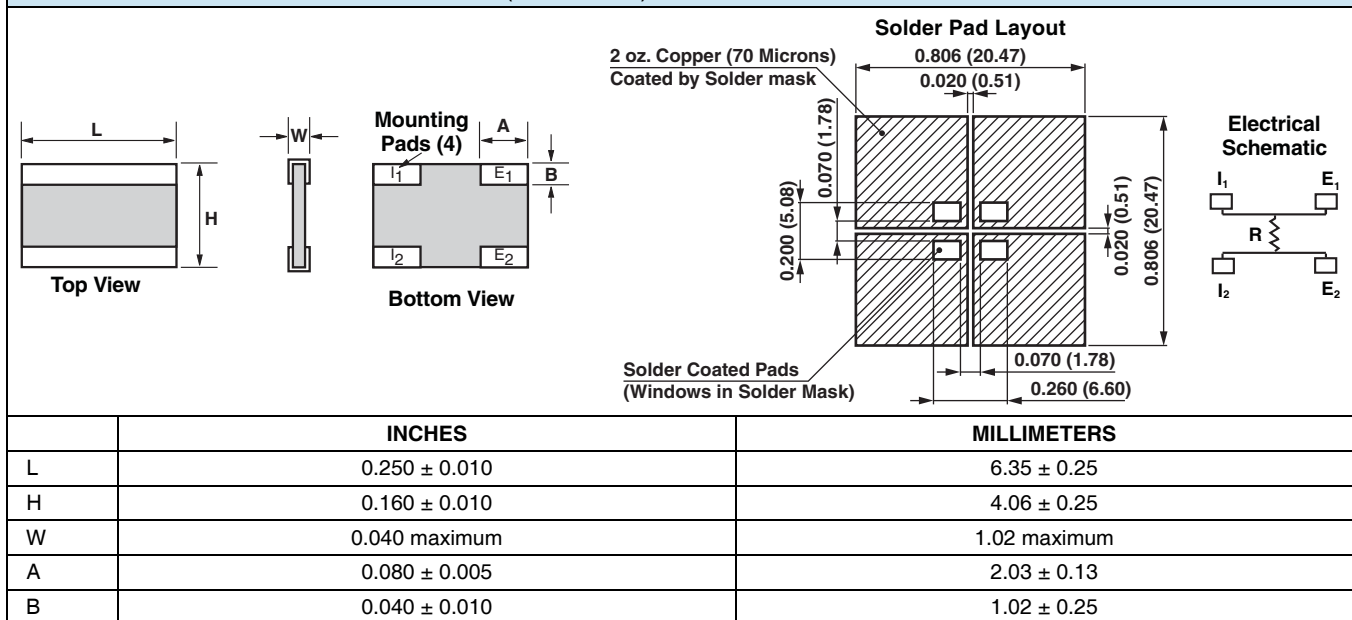
(2) Whichever is lower

(3) See solder pad layout at figure 2

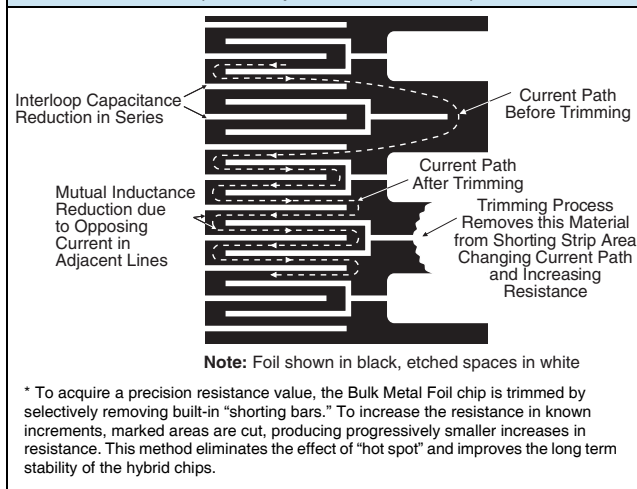
(4) 0.05% and 0.1% are also available per special request

\* Pb containing materials are not RoHS compliant, exemptions may apply

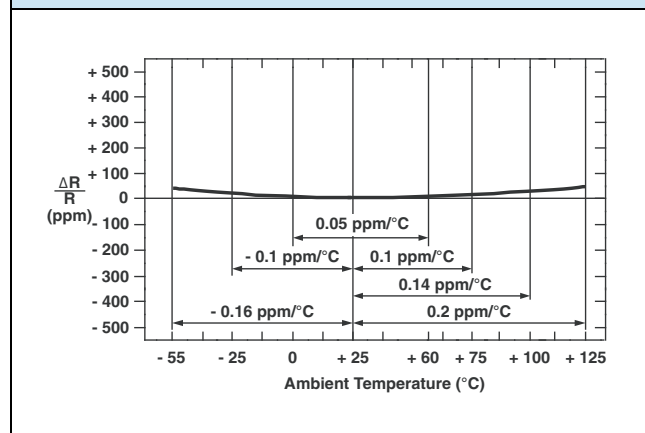
**FIGURE 2 - DIMENSIONS** in Inches (Millimeters)



**FIGURE 3 - TRIMMING TO VALUES**  
(Conceptual Illustration)\*



**FIGURE 4 - TYPICAL TCR CURVE Z-FOIL**



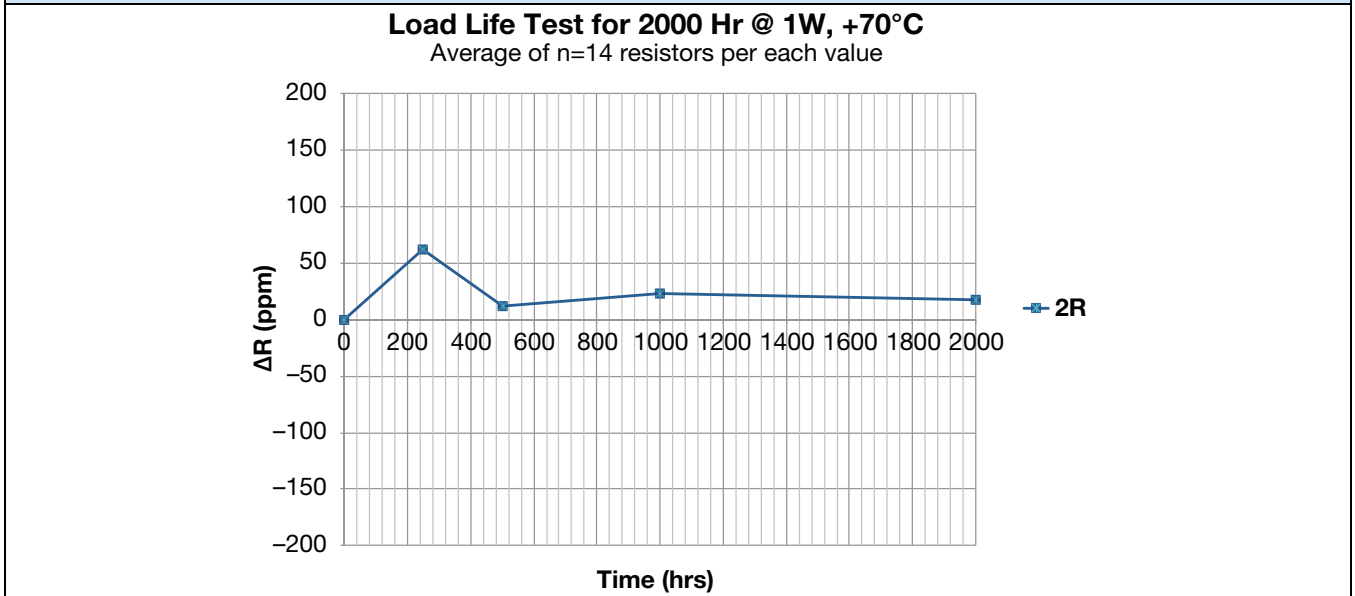
**TABLE 2 - PERFORMANCE SPECIFICATIONS**

TEST	MIL-PRF-55342 ΔR LIMITS	TYPICAL ΔR LIMITS	MAXIMUM ΔR LIMITS <sup>(1)</sup>
Thermal shock 5 x (- 65 °C to + 150 °C)	± 0.10 %	± 0.005 % (50 ppm)	± 0.01 % (100 ppm)
Low temperature operation, - 65 °C, 45 min at P <sub>nom</sub>	± 0.10 %	± 0.005 % (50 ppm)	± 0.01 % (100 ppm)
Short time overload, 6.25 x rated power, 5 s	± 0.10 %	± 0.005 % (50 ppm)	± 0.02 % (200 ppm)
High temperature exposure, + 150 °C, 100 h	± 0.10 %	± 0.01 % (100 ppm)	± 0.02 % (200 ppm)
Resistance to soldering heat	± 0.2 %	± 0.01 % (100 ppm)	± 0.03 % (300 ppm)
Moisture resistance	± 0.2 %	± 0.01 % (100 ppm)	± 0.03 % (300 ppm)
Load life stability 2000 h at 70 °C at 1 W	± 0.5 %	± 0.015 % (150 ppm)	± 0.025 % (250 ppm)

**Note**

(1) Measurement error 0.001R

**FIGURE 5 - LOAD LIFE TEST**



**POST MANUFACTURING OPERATIONS (PMO)**

Military applications can include requirements for performance under conditions of stress beyond the normal and over extended periods of time. This calls for more than just selecting a standard device and applying it to a circuit. The standard device may turn out to be all that is needed but an analysis of the projected service conditions should be made and it may well dictate a routine of stabilization known as post manufacturing operations (PMO). The PMO operations that will be discussed are only applicable to Foil resistors. They stabilize Foil resistors while they are harmful

to other types. Short time overload, accelerated load life, and temperature cycling are the three PMO exercises that do the most to remove the anomalies down the road. Foil resistors are inherently stable as manufactured. These PMO exercises are only of value on foil resistors and they improve the performance by small but significant amounts. Users are encouraged to contact VPG's Foil applications engineering for assistance in choosing the PMO operations that are right for their application.

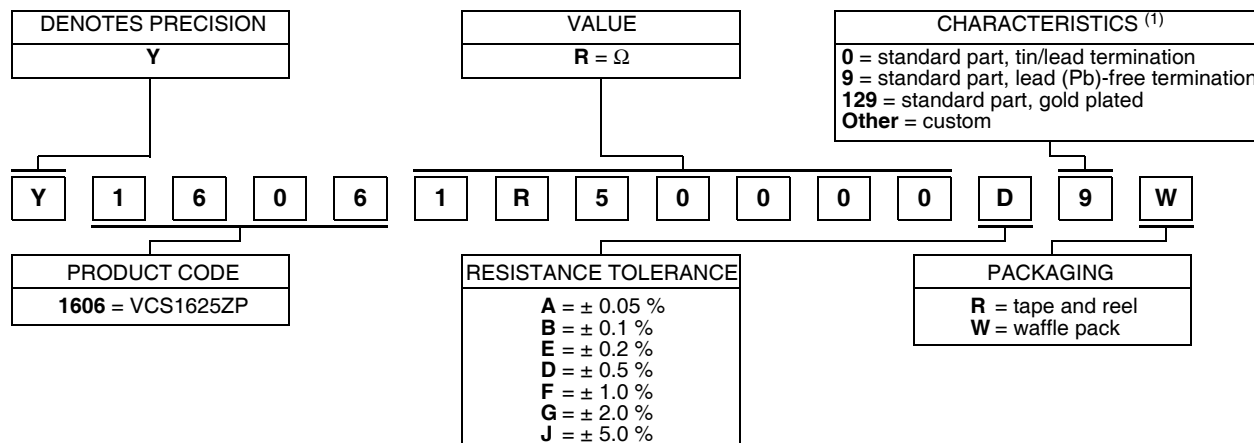
**FIGURE 6 - COMPARISON OF CURRENT SENSE RESISTORS IN SOLAR PANEL (PRODUCT DEMO)**



This video compares the variations in output current of a scaled-down model of a solar panel being monitored by three different current sense resistor technologies as the resistors are heated. All three output signals are displayed together for direct comparison. The next-generation VFR foil resistor is compared to thick film and metal band current sense resistors, all in 4-terminal Kelvin configurations. Each technology has distinctly different patterns of response to the heat source, with the foil having virtually no change and continuing a precise reading of the output current regardless of the heat applied.

### TABLE 3 - GLOBAL PART NUMBER INFORMATION

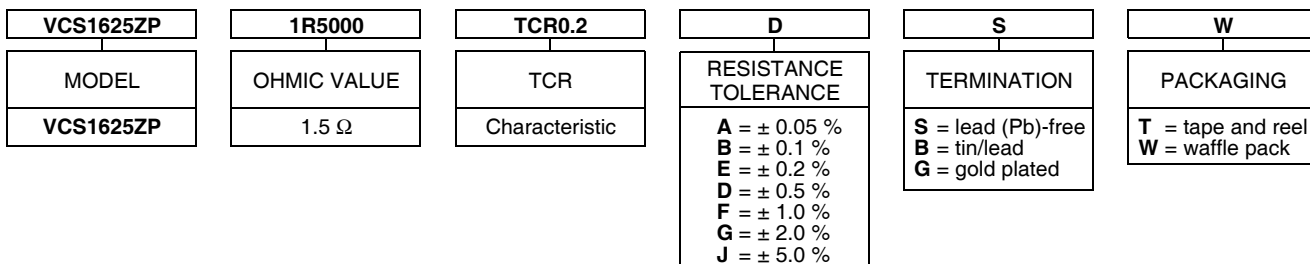
NEW GLOBAL PART NUMBER: Y16061R50000D9W (preferred part number format)



FOR EXAMPLE: ABOVE GLOBAL ORDER Y1606 1R50000 D 9 W:

TYPE: VCS1625ZP  
 VALUE: 1.5 Ω  
 ABSOLUTE TOLERANCE: ± 0.5 %  
 TERMINATION: lead (Pb)-free  
 PACKAGING: waffle pack

HISTORICAL PART NUMBER: VCS1625ZP 1R5000 TCR0.2 D S W (will continue to be used)



**Note**

<sup>(1)</sup> Application engineering release: for non-standard requests, please contact application engineering.



## Disclaimer

ALL PRODUCTS, PRODUCT SPECIFICATIONS AND DATA ARE SUBJECT TO CHANGE WITHOUT NOTICE.

Vishay Precision Group, Inc., its affiliates, agents, and employees, and all persons acting on its or their behalf (collectively, "VPG"), disclaim any and all liability for any errors, inaccuracies or incompleteness contained herein or in any other disclosure relating to any product.

The product specifications do not expand or otherwise modify VPG's terms and conditions of purchase, including but not limited to, the warranty expressed therein.

VPG makes no warranty, representation or guarantee other than as set forth in the terms and conditions of purchase. **To the maximum extent permitted by applicable law, VPG disclaims (i) any and all liability arising out of the application or use of any product, (ii) any and all liability, including without limitation special, consequential or incidental damages, and (iii) any and all implied warranties, including warranties of fitness for particular purpose, non-infringement and merchantability.**

Information provided in datasheets and/or specifications may vary from actual results in different applications and performance may vary over time. Statements regarding the suitability of products for certain types of applications are based on VPG's knowledge of typical requirements that are often placed on VPG products. It is the customer's responsibility to validate that a particular product with the properties described in the product specification is suitable for use in a particular application. You should ensure you have the current version of the relevant information by contacting VPG prior to performing installation or use of the product, such as on our website at [vpgsensors.com](http://vpgsensors.com).

No license, express, implied, or otherwise, to any intellectual property rights is granted by this document, or by any conduct of VPG.

The products shown herein are not designed for use in life-saving or life-sustaining applications unless otherwise expressly indicated. Customers using or selling VPG products not expressly indicated for use in such applications do so entirely at their own risk and agree to fully indemnify VPG for any damages arising or resulting from such use or sale. Please contact authorized VPG personnel to obtain written terms and conditions regarding products designed for such applications.

Product names and markings noted herein may be trademarks of their respective owners.

Copyright Vishay Precision Group, Inc., 2014. All rights reserved.







## Looking for pricing, stock, or lifecycle information?

Click below to explore more details on WIN SOURCE:

 [View Y16063R30000F9R on WIN SOURCE](#)

 [Vishay Information](#)

## Optimize Your Supply Chain with WIN SOURCE Solutions

-  Global Sourcing Solution
-  Obsolete Management
-  Cost Control Management
-  Shortage Management
-  Alternative Solution
-  Excess Inventory Management